Specification Amendments:

Please amend the specification as indicated:

Please replace the Co-Pending Applications paragraph on page 1 of the specification with the following:

CO-PENDING APPLICATIONS

This application is related to United States Patent Application Serial No. ~~AA/AAA,AAA~~09/905,226, entitled "System and Software for Data Distribution in Semiconductor Manufacturing and Method Thereof," United States Patent Application Serial No. ~~AA/AAA, AAA~~09/905,213, entitled "System and Software for Database Structure in Semiconductor Manufacturing and Method Thereof," United States Patent Application Serial No. ~~AA/AAA,AAA~~09/904,619, entitled "System and Software for Process Control with Fabrication Operator Interface and Method Thereof," United States Patent Application Serial No. ~~AA/AAA,AAA~~09/905,221, entitled "System and Software for Data History Reconstruction in Semiconductor Manufacturing and Method Thereof," United States Patent Application Serial No. ~~AA/AAA,AAA~~09/904,953, entitled "System and Software for Normalization and Denormalization of Data in Semiconductor Manufacturing and Method Thereof," United States Patent Application Serial No. ~~AA/AAA,AAA~~09/905,241, entitled "Process Control Interface in Semiconductor Manufacturing and Method Thereof," United States Patent Application Serial No. ~~AA/AAA, AAA~~09/905,222, entitled "System and Software for Statistical Process Control in Semiconductor Manufacturing and Method Thereof," all filed ~~of even date herewith~~July 12, 2001.

Please replace the fourth paragraph beginning on line 10 on page 3 of the specification with the following:

~~FIG. 4 is a flow diagram~~FIGS. 4A and 4B are flow diagrams illustrating a typical operation of a process control system according to at least one embodiment of the present disclosure;

Please replace the fifth paragraph beginning on line 12 on page 3 of the specification with the following:

~~FIG. 5 is a block diagram~~FIGS. 5A and 5B are block diagrams of the major subsystems of a process control system according to at least one embodiment of the present disclosure;

Please replace the last paragraph beginning on page 8 of the specification with the following:

The flow directional arrows going from each of the actors (301-306) has a numerical sequence and notation written under the directional arrow. The number indicates the order of the sequence within the system, and incrementing a number decimally indicates the "order" in a flow with multiple steps, thus 4 occurs first, 4.1 second, 4.2 third, 4.3 fourth, 4.3.1 fifth, 4.3.1.1 sixth, and so on. The notation after a number under the directional arrows indicates the event or operation initiated or conducted by the respective actor class, and the rectangular box indicates the package name or object class name upon which the actors "act." Thus, AutomationUser 301 1:"create" indicates that AutomationUser 301 would create the object named ToolCapabilitySpec ~~305~~308. The second action (2) is creation of the DataCollectionPlan 307 by ToolOwner 302. A third (3) action is creation of SPCPlan 309 by SPCExpert 303. Then MES 304 sends DCIN message (4) to :EI 306, which gets (4.1) DataCollectionPlan 307, measures the product (4.2), transmits the data (4.3) to the EDCBroker 311. EDCBroker 311 updates (4.3.1) DataHistory 313, which is stored (4.3.1.1) by Database 315. Another action taken by EDCBroker 311 is to update data (4.3.2) to the engineering data analysis interface, :EDALoader 317, followed by updates (4.3.3) to the SPCProcedure. Then SPCProcedure 319 gets (4.3.3.1) SPCPlan 309. Should an out of control condition exist requiring a tool shutdown, SPCProcedure 319 sends a perform error action (4.3.3.2) to MES 304. SPCProcedure 319 also updates (4.3.3.3) the data to the ChartClient 321. WFT 305 views the chart and sends a. correctError message (5) to Chart Client 321, which, in turn, sends a ~~perormCorrectiveAction~~ performCorrectiveAction (6) message to MES 304.

Please replace the paragraph beginning on line 12 on page 9 of the specification with the following:

An example representing typical operations of the process control system is presented in FIG. 4 (FIGS. 4A-4B), which is a flow diagram of a typical operation of the process control system according to at least one embodiment of the present invention. It should be noted that although the steps in ~~FIG. 4~~FIGS. 4A-4B are described in a sequential order for purposes of illustration, some steps may be performed simultaneously with other steps, or some steps may be performed in a different order than shown in ~~FIG. 4~~FIGS. 4A-4B. In step 405, an automation user creates a tool capability specification, known as a data collection capability specification (DCCS). In at least one embodiment, a DCCS is a versioned document that defines the data collection capabilities of a tool (i.e., contexts, events, and parameters). For any given tool, a data collection capability specification (DCCS) version is created before a data collection plan (DCP) is implemented. In step 407, a tool or process owner creates a data collection plan (DCP), which, in one embodiment, is a versioned document that defines the parameters that a tool should collect at a particular context. In step 409, the data collection plan gets the tool capability specification or DCCS. Hence a graphical user interface is used to receive for analysis a first selection indicating a set of statistical process control data associated with a semiconductor process; a second selection indicating what processing is to be performed on the set is received, and a statistical process subsystem processes the statistical process control data in accordance with the processing indicated by the second selection. A data collection plan (DCP) is associated with a DCCS and is attached to at least one MES context. An MES context is the means by which DCPs are selected for engineering data collection. If a DCP is not attached to a context, it will not be used.

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Please replace second paragraph, beginning on line 20 on page 10 of the specification with the following:

In addition, an embodiment enables the performance of high-level process controls in the form of tool shutdowns (making a machine unavailable for use), lot holds, and lot releases. This high-level process control capability applies to metrology tools and semiconductor processing tools, and even to the level of an individual chamber within a semiconductor processing tool

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having multiple chambers, or an individual polish head, for example, in the case of a tool with multiple polish heads. This feature is seen in the latter steps of the flow chart of FIG. 4 (FIGS. 4A-4B), as in step 445 where, if an error is detected, i.e., an out of control (OOC) condition exists, SPC procedure sends a message to the MES system (performErrorAction). In step 450, statistical process control (SPC) updates data for the chart client, and the wafer fabrication technician views SPC charts with the chart client, notes the error, and documents the action in step 455. In step 460, the wafer fabrication technician documents the corrective action to the SPC procedure. In step 470, the SPC sends a perform corrective action message to MES system.

Please replace second full paragraph, beginning on line 1 on page 11 of the specification with the following:

Various features and functional capabilities of the method as embodied have been presented in broad terms, hence now discussion will turn to the finer details of the various parts of the arrangement. FIG. 5 (FIGS. 5A-5B) is a block diagram of the major subsystems of the data collection and process control system. The components within the data collection and process control system domain 501, indicated by the area shaded in lighter grey, includes a chart viewing client subsystem 505, statistical process control subsystem 507, the engineering data collection subsystem 508, an interface 509 to the engineering data analysis system 511, and a tap 503 which intercepts all communications between the equipment interface 512 and console 504. Console 504 serves as the interface between the engineering data collection subsystem 508 and the equipment interface 512.

Please replace third full paragraph, beginning on line 11 on page 11 of the specification with the following:

The area shaded in darker grey in ~~FIG. 5~~FIGS. 5A-5B indicates the transaction processing and performance monitoring system areas 515 which are utilized by the various subsystems in process control system 501. Transaction and performance monitoring system components may be thought of as an underlying support layer, or "glue" which consolidates and orchestrates the smooth, seamless function of data collection and process control system 501. The transaction and performance monitoring area 515 includes the interface 517 between the

MES system 513 and the SPC subsystem 507. The graphical user interface (GUI)/HTTP-based web program interface 519 allows a more user-friendly graphical presentation than that of the monolithic interfaces of the past for communicating with the other applications within the data collection and process control system domain 501 and the transaction and performance monitoring system area 515. Via a common web interface 519 on console 504, for example, users can create or edit versioned documents 523 such as a data collection capability specification (DCCS) or a process control specification (PCS). It should be noted that in at least one embodiment, versioned documents 523 are not files, and are not stored as binary large objects (BLOBs). Each of the versioned documents 523 has its own tables in the transaction processing database into which it writes its attributes, which allows configuration data to be accessible to reporting tools. An assortment of other application programming interfaces exist within transaction and processing area 515, such as process context 529 which is a rule-matching algorithm used to identify a DCP attached to a context matching the applicable MES context, service management 530 which groups components together into services for reliability purposes, system management 532 which controls the configuration and startup/shutdown of the system, and persistence 534, which is responsible for storing the attributes of objects into the database. In addition, security 536 authenticates users and authorizes them to perform particular functions within the system, communication 539 is the facility that allows the transmission of information from one component to another, often over a network, logging 540 which records significant events that occur in the system for troubleshooting purposes, and workflow 538. Workflow 538 insures that a versioned document that has been submitted for approval is properly routed to obtain the appropriate approvals before changes to the system proposed by the submitted versioned document become effective.

Please replace third full paragraph, beginning on line 11 on page 12 of the specification with the following:

The major subsystems within the process control system shall now be presented, beginning with FIG. 6, a block diagram of the equipment interface communication (tap) subsystem within the data collection and process control system according to an embodiment of the present disclosure. It should be noted that the chosen order of presentation of the various subsystems is not meant to imply that one particular subsystem is more "important" than

another subsystem. As seen in FIG. 6, tap 603 may be thought of as a constant-monitoring type of device which intercepts all communications between equipment interface 612 and transaction and performance monitoring system console 604. Console 604 serves as the interface between the engineering data collection (EDC) subsystem 608 and the equipment interface 612. Tap 603 is responsible for getting data out of tools 618 and into the data collection and process control system (501, ~~FIG. 5~~FIGS. 5A-5B). Tap 603 queries EDC controller 667 within EDC subsystem 608 for a data collection plan (DCP), and then sets up data collection according to the instructions in the DCP. EDC broker 665 receives the data collected according to the DCP, and sends it to the various subscribers (not illustrated). In one embodiment, once data is collected, it is stored in the entity data model, which is part of a semiconductor fabrication facility's equipment interface baseline (not illustrated). The tap 603 knows how to convert the entity data model to FIDOSpeak (a simple ASCII language) and feed it to console 604 over UNIX standard input 611. The console 604 transmits the data 615 to the EDC broker 665 within the EDC subsystem 608.

Please replace last paragraph, beginning on line 24 of page 14 of the specification with the following:

Referring now to FIG. 8, a block diagram of the statistical process control (SPC) subsystem of data collection and process control system 501 (~~FIG. 5~~FIGS. 5A-5B) according to an embodiment of the present disclosure, is presented. The statistical process control (SPC) subsystem, which includes SPC controller 807, and SPC procedure 810, is the heart of the data collection and process control system in the various embodiments as disclosed herein. SPC is responsible for performing calculations to generate statistics on collected data, applying rules to the statistics, and executing error actions when those rules are violated, and is supported through underlying transaction and performance monitoring system component 815. The SPC procedure 810 is a statistical engine that performs what the process control strategy 884 describes. A process control strategy (PCS) 884 is an SPC configuration mechanism that defines the context at which to pull data from the database (i.e., the process to be controlled), the data to be used to calculate the statistical points (what data should be analyzed), how the data is processed and interpreted for SPC, and actions to take based upon the interpreted data (the rules to apply and the actions to be taken when rules are violated). There is one SPC procedure 810 for each PCS 884. The PCS 884 is one of the versioned documents maintained within the transaction and processing system versioned document area 825. Other application

programming interfaces in support of versioned documents 825 are workflow 838, and a web user interface (UI) 819.

Please replace second paragraph beginning on line 8 on page 25 of the specification with the following:

For example, if the group by attribute for Mean FICD 1706 is changed to Product (not shown) in the Group By drop down menu 1715 associated with Mean FICD 1706, the group by attribute for StdDev FICD 1707 and Normalized FICD 1708 will automatically be changed to Product because all three statistics are linked by having their respective Linked checkboxes 1710 checked, as illustrated in FIG. 17. A user selects from the Group By drop down menus 1715 to change an attribute on which grouping is based. Examples of some choices available from the Group By drop down menus 1715 may include lot, product, recipe, or operation. A user selects from the Order By drop down menus 1720 to change an attribute on which ordering is based. Examples of some choices from Order By drop down menus 1720 may include processing time at some prior context, metrology time, or lot number . The Go button ~~175~~ 1725 is selected to regenerate the graphs and display the new grouped and/or ordered chart. To cancel the operation, the user selects the Cancel button 1730.

Please replace the last paragraph beginning on line 14 on page 32 of the specification with the following:

As shown in FIG. 20, the software system of an embodiment of the present disclosure may utilize a three-tier architecture (browser, web server, database). The highest tier 2010 is the Presentation Layer, the object-oriented remote method invocation (RMI) environment consisting of the menus, buttons, dialog boxes, charts and other items able to be seen by the user. The middle tier 2020 contains the Business Logic/Application Middleware Layer such as the Java server components that are responsible for distributing objects across servers and networks (i.e., the Internet). The lowest tier 2030, the Storage Layer, is a database containing raw production data that is connected by the Middleware Layer to other servers and the Presentation Layer. Oracle may be used as the database management system in lowest tier 2030. It should be noted that other architecture, such as a four-tier architecture (~~browner~~browser, web

server, application server, database), may also be employed to practice the teachings as disclosed herein.